



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/755,856	01/12/2004	Maurice Gell	UCT-0040	8424
23413	7590	01/27/2006	EXAMINER	
CANTOR COLBURN, LLP 55 GRIFFIN ROAD SOUTH BLOOMFIELD, CT 06002			XU, LING X	
			ART UNIT	PAPER NUMBER
			1775	

DATE MAILED: 01/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/755,856	Applicant(s) GELL ET AL.	
	Examiner Ling X. Xu	Art Unit 1775	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 02 December 2005.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-63 is/are pending in the application.
- 4a) Of the above claim(s) 1-15, 32, 53-58, 61 and 62 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 16-31, 33-52, 59, 60 and 63 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |                                                                                                                                                |                                                                                         |
|------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                                                    | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                                           | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>See Other</u> . | 6) <input checked="" type="checkbox"/> Other: <u>See Continuation Sheet</u> .           |

Continuation of Attachment(s) 6). Other: IDSs: 6/27/2005, 10/21/04, 8/23/04.

## DETAILED ACTION

### *Election/Restrictions*

1. Applicant's election of Group II and species of thermal barrier coatings in the reply filed on 12/2/2005 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claims 16-31, 33-52, 59-60 and 63 read on the elected invention and species. Claims 1-15, 32, 53-58 and 61-62 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention and species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 12/2/2005.

### *Claim Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 16-18, 30-31 and 33-34 are rejected under 35 U.S.C. 102(b) as being anticipated by Guilemany et al. (High Temperature Surface Engineering, Proceedings of the International Conference in the Series 'Engineering the Surface', 6<sup>th</sup>, Edinburgh, United Kingdom, 2000, p 275-281)

Art Unit: 1775

With respect to claims 16-18 and 31, Guilemany discloses a material comprising splats having an average diameter (width) of less than 2 micrometers and a thickness (height) of less than 800nm (abstract). Guilemany also discloses that all splats are less than 5 micrometers in diameter (abstract).

With respect to claims 30, Guilemany discloses that the material having a thickness of 275um total (page 276).

With respect to claims 33-34, Guilemany discloses that the material comprising aluminum oxide and aluminum nitrite (abstract).

3. Claims 16, 19-20, 26-27, 29, 30-31 and 33-36 are rejected under 35 U.S.C. 102(b) as being anticipated by Lin et al. (Journal of Thermal Spray Technology, vol. 3(1), March, 1994 p75-104).

With respect to claims 16 and 30-31, Lin discloses a thermal sprayed coating having thickness of greater than 25 um (abstract) to about 25 mm (page 75). The coating comprises splat of up to 80um in diameter (abstract), which includes the range as recited in claim 16.

With respect to claims 19-20 and 29, Lin discloses that the coating porosity may be less than 5% (page 5%) and since the structure is a microstructure, the pores are considered less than micrometer sized.

With respect to claims 26-27, Lin discloses that the coating comprising vertical crack in the range of 10-100 um, which can be 0.5-1.0 times of the thickness of the material when the coating thickness is greater than 25 um (page 87).

Art Unit: 1775

With respect to claims 33-36, Lin discloses that the material may be aluminum oxide or zirconia stabilized with yttria (page 86, table 4).

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 16-23, 26, 29-31, 33-36 and 59-60 are rejected under 35 U.S.C. 102(e) as being anticipated by Gell et al. (US 2003/0108680).

With respect to claims 16-18 and 22-23, Gell discloses a duplex microstructure comprising a fully melted region (splats) with smaller sized structure and a partially melted region (inter pass boundary) comprising larger micrometer sized structure (page 4, [0053]). The splat contains nano and submicro-sized columnar grains and the size of the incomplete melting region ranges from 100 nm to 2000 nm (page 10, [0110]).

With respect to claims 19-21, 29 and 59, Gell discloses the porosity of the microstructure material is about 6-10% (Fig. 17). Since the structure is a microstructure, the pores are considered to be less than micrometer sized. The structure is a three-dimensional structure, accordingly, the pores would also be a three-dimensional.

With respect to claim 26, Gell discloses the material comprising one or more vertical cracks, see Fig. 19-20.

Art Unit: 1775

With respect to claims 30-31, 33-36 and 60, Gell discloses that microstructure material having a thickness of 200-800 micrometers and can be in the form of coatings (page 5, [0058]). The material is made of zirconium oxide stabilized with yttrium oxide (page 2, [0039]).

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 19-21, 26-31, 33-36 and 59-60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Guilemany as applied to claims 16-18, 30-31 and 33-34 above, and further in view of Taylor et al (US 5,520, 516).

As stated above, Guilemany discloses the same coating material as recited in claims 16-18, 30-31 and 33-34.

Guilemany does not disclose that the coating material having the porosity and vertical cracks as claimed.

With respect to claims 19-21, 29 and 59, Taylor teaches a thermal barrier coating having porosity of about 2%-10% (col. 4, lines 30-40).

With respect to claims 26-28, Taylor teaches a zirconium based oxide coating comprising a plurality of vertical macrocracks from 4 mils up to the thickness of the coated layer and having 5-100 vertical cracks per linear centimeter (col. 2, lines 59-67 and col. 3, lines 1-10).

Art Unit: 1775

With respect to claims 30-31 and 60, Taylor teaches a zirconium based oxide coating having a thickness of 50-1000 microns (col. 3, lines 35-40).

With respect to claims 33-36, Taylor teaches that the zirconium based oxide is a zirconia stabilized with yttria with amount of from 6.5 to 9 weight percent yttria (col. 5, lines 20-35).

Taylor also discloses that the thermal barrier coating having substantially homogeneous dispersion of vertical macrocracks throughout the coating can improve its thermal fatigue (col. 2, lines 29-40).

Therefore, it would have been obvious to one of ordinary skill in the art to make the thermal barrier coating disclosed by Guilemany with vertical cracks in order to improve its thermal fatigue, taught by Taylor.

6. Claims 37-38, 45-46 and 49-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lin et al., as applied to claims 16, 19-20, 26-27, 29, 30-31 and 33-36 above, and further in view of Schlichting (a Dissertation submitted in partial Fulfillment of the Requirements of the Degree of Doctor of Philosophy at the University of Connecticut, 2000).

As stated above, Lin discloses the same coating material as recited in claims 16, 19-20, 26-27, 29, 30-31 and 33-36.

Lin does not disclose that the porosity of the material is about 15% to about 40% as recited in claim 37.

Schlichting teaches that the typical thermal barrier coating has between 10% and 20% porosity in order to exhibits better insulation and spalling resistance or better erosion resistance (page 14).



Art Unit: 1775

Therefore, it would have been obvious to one of ordinary skill in the art to use thermal barrier coating with porosity in the range of 10% to 20% in order to obtain the coating with better insulation and spalling resistance or better erosion resistance, as taught by Schlichting.

7. Claims 37-40, 43-46 and 49-52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gell et al., as applied to claims 16-23, 26, 29-31, 33-36 and 59 above, and further in view of Schlichting (a Dissertation submitted in partial Fulfillment of the Requirements of the Degree of Doctor of Philosophy at the University of Connecticut, 2000).

As stated above, Gell discloses the same material as recited in claims 16-23, 26, 29-31, 33-36 and 59.

Gell does not disclose that the porosity of the material is about 15% to about 40% as recited in claim 37.

Schlichting teaches that the typical thermal barrier coating has between 10% and 20% porosity in order to exhibit better insulation and spalling resistance or better erosion resistance (page 14).

Therefore, it would have been obvious to one of ordinary skill in the art to use thermal barrier coating with porosity in the range of 10% to 20% in order to obtain coatings with better insulation and spalling resistance or better erosion resistance, as taught by Schlichting.

It is noted that Gell and the present application appear to have the same assignee. Gell may be disqualified as prior art for a rejection under 35 USC 103(a). However, the burden of establishing the subject matter cited in Gell is disqualified as prior art is placed on applicants. The fact that Gell and the present application have the same assignee is not sufficient evidence to

Art Unit: 1775

disqualified Gell as prior art. There must be a statement submitted by the applicant that the subject matter in Gell and the claimed invention were "at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person."

*Allowable Subject Matter*

8. Claims 24-25, 41-42, 47-48 and 63 are allowed.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ling X. Xu whose telephone number is 571-272-1546. The examiner can normally be reached on 8:00 - 4:30 Monday - Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah D. Jones can be reached on 571-272-1535. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Ling X. Xu  
Primary Examiner  
Art Unit 1775